

Plan Elements for Restoration of Tidal Marsh Habitat at Lois Island Embayment Columbia River Channel Improvement Project

Response to Oregon Division of State Lands

Collection of baseline (pre-construction) data for the Lois Island embayment restoration location is covered in more detail in the implementation plan for the NOAA Fisheries Service/U.S. Fish and Wildlife Service terms and conditions, CRCIP BiOp. The Corps has outlined the location (e.g. Lois Island east marsh (natural marsh), fringing tidal marshes at Lois Island, Mott Island and South Tongue Point (dredged material established marsh), and within the restoration feature (embayment) where juvenile salmonid fisheries, benthic invertebrate productivity and tidal marsh productivity would be measured pre- and post-construction. Sampling methodology would follow that of CREDDP (tidal marsh) and NOAA Fisheries (fisheries/benthic invertebrates) used previously in the Columbia River Estuary. Use of their methodology will allow for comparison to historical/recent studies.

The pre-construction surveys would assess the baseline condition for the identified locations. Tidal marsh elevation data would be determined for the established fringing marshes at Lois Island, Mott Island and South Tongue Point. The elevation information obtained at these locations would provide the target elevation for tidal marsh development in the embayment. These reference locations are subject to the same tidal and river stage levels as the restoration location. They have an established tidal marsh community on dredged material, thus validating their use for the tidal marsh construction target elevation. They also provide a reference location to establish plant community and fisheries/benthic invertebrate objectives for the restoration feature.

Bathymetry data for Lois Island embayment was obtained in 2002 (Figure 1). The sediment type at Lois Island embayment is very fine material. Sediment samples taken associated with the Tongue Point Monitoring Program 1989-1992 provide confirmation of sediment characteristics in the Lois Island embayment. Bottom sediment information will be again characterized pre-construction based on grab samples and/or an extra core sample obtained from each benthic invertebrate sample location.

Avian use of the open water of Lois Island embayments is relatively minor compared to the other areas of the Columbia River Estuary, particularly tidal marsh, shallow bays (Miller Sands Lagoon), or productive shallow habitat (North of Rice Island). Small numbers of diving ducks (scaup, bufflehead, ruddy ducks) make use of the embayments' open water. Similarly, small numbers of western grebes, double-crested cormorants, other grebe species and loons are observed on these open waters. Waterfowl, specifically dabbling ducks and western Canada geese frequent the tidal marsh abutting the lagoon. Shorebird use is nil given the absence of intertidal mudflat habitat. Bald eagles are the predominant raptor, with nesting and foraging territories abutting the embayment. Osprey are present and other raptor species frequent adjacent habitat. Gulls and Caspian terns are present in small numbers foraging over the open waters of the embayment. Use by other avian species, except foraging by swallow species, is nil.

Mammal use of the embayment is also considered negligible. California sea lions and harbor seals are occasionally present although they are most commonly observed in the main river. Nutria, beaver, muskrat, river otter and mink are present although their use/presence is more closely associated with the riparian forest – tidal marsh – embayment edges. Their presence in the open waters of the embayment would be characterized as transitory in nature. Land based mammal use of the embayment would be considered nil.

The sump location (Figure 2) adjacent to the channel would also be characterized for bathymetric, fisheries, benthic invertebrate, current and velocity, bottom sediment, birds and mammals prior to construction. Bathymetric data is available from the Corps' annual crossline surveys that cover the area. Current and velocity data would be ascertained from recent modeling efforts. Fisheries and benthic invertebrate data will be characterized based on information obtained from comparable locations in the estuary and/or navigation channel. Should inadequate benthic and fisheries data be available from a comparable location, then pre-construction sampling at the sump location would be initiated using normal NOAA Fisheries sampling protocol.

Avian use of the sump location can be characterized as minimal. Gulls and Caspian terns would be the principal users. Gull presence would be most noticeable during smelt runs and even the relatively transitory. Caspian tern use is seasonal and related to their foraging on salmon smolts. Use by other avian species is generally minimal. A few surf scoters and diving ducks, western grebes and double-crested cormorants occur in the area. Bald eagle use is transitory in nature as they travel from the Oregon shoreline to Taylor Sands.

Marine mammal use, principally California sea lion and harbor seal, is also transitory as they follow fisheries runs into the river. No cetaceans typically occur this far up the river. Other mammal use of the embayment is negligible.

The specific reference sites for tidal marsh developments at Lois Island embayment are located in the existing tidal marsh habitat fringing Lois Island, Mott Island and South Tongue Point. These locations are adjacent to the embayment as fringing marshes at the two islands and exterior to the embayment incur a more extreme wave and wind energy environment, thus are not comparable. An additional reference location will be located in the naturally established marsh habitat east of Lois Island.

These reference locations will provide the target elevation for construction of tidal marsh habitat in the embayment. Target elevation will be based on the elevation surveys extending from intertidal flat-marsh to the marsh-riparian transition line. This will provide a range of elevations in which tidal marsh is known to occur. The construction target elevation would be predicated upon "high" tidal marsh although construction acceptability would fall with the range of elevation that tidal marsh occurs at the reference location. This would provide some construction flexibility plus allow for diversity within the tidal marsh.

Reference sites for tidal marsh plant production, fisheries and benthic invertebrates will be permanently marked (staked) and their GPS location recorded to assure they are reoccupied during subsequent monitoring efforts.

The overall goal of the Lois Island ecosystem restoration feature is the establishment of a tidal marsh plant community comparable in elevation, fisheries, benthic invertebrate and plant community composition, density and/or productivity to the reference fringing tidal marshes at the embayment. The reference natural marsh east of Lois Island would provide an optimum scenario for restoration although it is not the stated goal of the effort.

The initial objective for the tidal marsh restoration is construction placement of dredged material to the target elevation derived from the reference location. Thereafter, objectives for the tidal marsh is the development of a tidal marsh, benthic invertebrate and fisheries community with comparable species composition, density, productivity and/or use level to that identified for the reference locations during concurrent sampling efforts.

The initial success criteria pertain to the post-construction elevation of the material placed for tidal marsh development. The Corps will examine post-construction surveys conducted by the contractor to establish that the correct elevation has been attained. Tidal marsh plant community, benthic invertebrate and juvenile salmonid parameters for reference and restoration feature sampling locations will be obtained in construction years 1 and 2 plus O&M years 2, 6 and 10. It is anticipated that no monitoring would be conducted after O&M year 10 unless contingency plans had to be implemented.

The specific project boundaries will be effectively based on the volume of material available and the volume required to attain the target elevation for tidal marsh establishment. The Corps estimates that 191 acres would be filled with material derived from the two-year construction period. To fill out to the 357-acre increment, dredged material placement over a 15-20 year time period of channel maintenance would be required to provide sufficient volume of material. Boundaries for the tidal marsh restoration area can be simply established through survey and establishment of GPS coordinates. This information would be furnished to the dredge contractor and the Corps construction inspector.

The construction concept envisions material placed against the fringing marsh on the east side of the embayment first with fill extending westward as the target elevation is attained. Dredged material would be placed via floating pipeline with the discharge end of the pipeline moved or shortened as the target elevation is reached. The width of each increment would be based upon the most efficient construction method as determined by the contractor.

Post-project elevations will be based upon actual elevations established via survey from the adjacent fringing tidal marsh. Tidal marsh habitat occurs over a range of elevations, actually a relatively narrow zone. The Corps will establish this range of elevations as the acceptable limits with a specific mid-point tidal marsh elevation as the principal target. A range of elevations will allow for more diversity in the tidal marsh plant community. Post-placement of dredged material, the contractor will be required to furnish a survey depicting final elevations.

No retaining walls, bulkheads, rip-rap or other structural features will be used to hold the dredged material in place in the Lois Island embayment. No planting are initially anticipated. Rather, we will rely upon the extensive natural marshes in the Cathlamet Bay region to provide seeds and other propagules to establish the tidal marsh plant community. All similar tidal marsh

plant communities associated with dredged material islands in the Columbia River estuary have established via this natural process.

Tidal channel development is anticipated to occur naturally over time in the constructed tidal marsh habitat. Grading, if determined necessary based upon post-construction observation and if physically possible, will be employed to establish tidal channels. Sideslope adjustment will occur on the edges of the constructed marsh as the slope stabilizes. This will result in some material feathering out onto the adjacent subtidal habitat. Tidal channel establishment will result in the discharge of material offsite as the channels incise into the substrate.

Placement of dredged material in the embayment to form tidal marsh habitat would occur during the inwater work period – November 1 – February 28. Dredged material derived from the navigation channel would be initially placed in the sump (Figure 1), between Columbia River mile 18-20 and adjacent to the channel. Placement of material in the sump would occur 1-2 months prior to the inwater work period to charge the sump with material and during the inwater work period to maintain a stockpile of material for the pipeline dredge. Recharge of the sump after the first inwater period and during construction would occur at the contractor's convenience. Placement of dredged material in the sump during the O&M phase of the project would most likely occur during the normal summertime dredging period. Removal of material from the sump would be dependent upon volume of material obtained from the channel, thus the periodicity of sump dredging and tidal marsh establishment would vary over the estimated period of 15-20 years required to obtain enough material to reach the 357 acre limit.

The monitoring effort for the tidal marsh habitat development and reference locations would begin in construction year 1 (prior to construction to establish a baseline), and then reoccur in construction year 2 and O&M years 2, 6, and 10. The monitoring effort for tidal marsh plant, benthic invertebrate and fisheries communities, including sampling methods, is provided in the attached monitoring plan. Monitoring reports will be provided at the conclusion of each monitoring year. These reports will be provided to the three principal federal agencies, members of the Adaptive Management Team and the Consultatory agencies.

Should the 25% plant coverage not be attained by the second year of project O&M, then the issue of whether to proceed with plantings will be addressed before the Adaptive Management Team and suitable contingency plans developed as determined necessary by the members of the Adaptive Management Team. Implementation of contingency efforts would be the responsibility of the Corps and sponsor ports. Tidal marsh plant seeds and propagules would be obtained from adjacent tidal marsh plant communities to planting efforts.

Settling of dredged material, such that the surface elevation falls below the target elevation (e.g. lowest elevation of tidal marsh as established from the reference tidal marsh habitats) would be resolved by placement of additional material on the constructed marsh to attain the proper elevation. Placement of material and associated grading, if necessary and physically possible, would occur during subsequent inwater work periods. Subsidence should be evident by the second year of construction and would be determined by survey.